

Variation in Eastern Andalusian Vowel Harmony*

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1 Overview

- A common approach to variation in OT: control over multiple grammars (Anttila 2006, 2007, Boersma & Hayes 2001, etc.).
- French schwa deletion (Dell 1973, e.g.):

(1) *envie de te le demander* ‘feel like asking you’

ãvidətələdəmãde	ãvidətələdmãde
ãvidtələdəmãde	ãvidtəldəmãde
ãvidətlədəmãde	ãvidələdmãde
ãvidətəldəmãde	ãvidətlədmãde

- *Local optionality* (Riggle & Wilson 2005): the choice to apply an optional process is made independently for each locus.
- Multiple-ranking analysis gets only maximal or minimal deletion:
 - MAX \gg *ə: no deletion
 - *ə \gg MAX: delete as much as possible
- Common assumption: forms with intermediate levels of deletion are harmonically bounded (Kaplan 2011, Kimper 2010, e.g.).
- Several alternative theories address this problem (Coetzee 2004, 2006, Kaplan 2011, Kimper 2010, Riggle & Wilson 2005).
- Eastern Andalusian vowel harmony supports multiple rankings these alternatives.
- This suggests we shouldn’t give up on multiple rankings just yet.

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2 Eastern Andalusian Vowel Harmony

- /s/-aspiration: word-final /s/ deletes, causing the new word-final vowel to become [-ATR] (Jiménez & Lloret 2007, Sanders 1998, Walker 2011):

(2)	<i>nenes</i>	néne	‘babies’	<i>mis</i>	mi	‘my (pl.)’
	<i>monos</i>	móno	‘monkeys’	<i>tus</i>	tʊ	‘your (pl.)’
	<i>asas</i>	ásæ	‘handles’	<i>tesis</i>	tési	‘thesis’
	<i>lejos</i>	lého	‘far’	<i>pesos</i>	pésɔ	‘weights’
	<i>mes</i>	mé	‘month’	<i>bocas</i>	bókæ	‘mouths’
	<i>tos</i>	tó	‘cough’	<i>tienes</i>	tjéne	‘you have’

- This triggers *metaphony*: the stressed syllable harmonizes for [-ATR].
- Nonfinal posttonic vowels optionally harmonize, but they do so as a block:

(3)	a.	<i>treboles</i>	trébole ~ tréβole	‘clovers’
	b.	<i>cómetelos</i>	kómetelo ~ kómetelo	‘eat them (for you)!’
			*kómetelo, *kómetelo	

- *Maximal harmony*: [-ATR] optionally spreads beyond the stressed syllable:

(4)	a.	<i>momentos</i>	moménto ~ móménto	‘instants’
	b.	<i>reloj</i>	reló ~ reló	‘watch’
	c.	<i>relojes</i>	relóhe ~ relóhe	‘watches’
	d.	<i>monederos</i>	moneðéro ~ moneðéro	‘purses’
			*moneðéro, *moneðéro	
	e.	<i>recógelos</i>	rekóhelo ~ rekóhelo ~ rekóhelo	‘pick them’
			*rekóhelo	

- Pretonic vowels harmonize as a block, and only if post-tonic vowels harmonize.
- High vowels are transparent:

(5)	a.	<i>crisis</i>	krísi	‘crisis’
	b.	<i>muchos</i>	múʃo	‘many’
	c.	<i>mios</i>	mío	‘mine (pl.)’
	d.	<i>cojines</i>	kohíne ~ kóhine	‘pillows’
	e.	<i>cotillones</i>	kotizóne ~ kətizóne	‘cotillions’

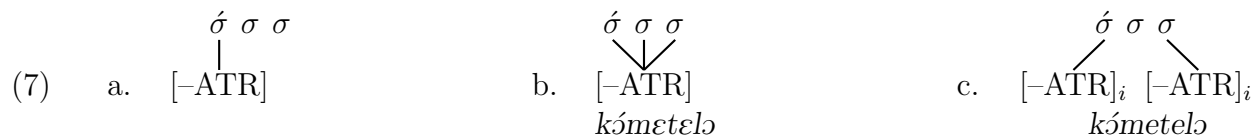
- Local optionality: harmony on one vowel doesn’t necessarily entail harmony on all vowels.
- But also “all-or-nothing” optionality: post-tonic harmony is coordinated, as is pretonic harmony.
- This hybrid system makes a good testing ground for theories of variation.

- We'll look at 3 theories:
 - Partial Orders (PO; Anttila 2007), a multiple-rankings theory
 - Serial Variation (SV; Kimper 2010)
 - Markedness Suppression (MS; Kaplan 2011)
- All three can produce EA harmony, but only PO does so satisfyingly.

3 Partial Orders

3.1 Metaphony

- Anttila (2007): a grammar is a partial ranking of constraints, not a total ranking.
 - When two constraints are not ranked with respect to each other, a ranking between them is chosen arbitrarily on each evaluation.
 - Jiménez & Lloret (2007), Walker (2011) develop a PO analysis of EA.
 - Metaphony is driven by LICENSE([-ATR], $\acute{\sigma}$):
- (6) LICENSE([-ATR], $\acute{\sigma}$): Assign one violation mark for each [-ATR] feature that does not coincide with a stressed syllable.
- Walker (2011) develops a theory of positional licensing and identifies three configurations in which licensing can be satisfied:



- EA uses (7b) and (7c).
 - The choice between them depends on the ranking of the following constraints:
- (8) a. *DUPLICATE: No corresponding elements in an output form. *favors* k \acute{o} m ϵ t ϵ l \omicron
 b. IDENT(ATR) *favors* k \acute{o} m ϵ t ϵ l \omicron
- (7a) is ruled out by constraints anchoring [-ATR] to the final syllable.

- Variable ranking between *DUPLICATE and IDENT = variation in post-tonic harmony:

(9) a.

/kometel-os/	LICENSE([-ATR], \acute{o})	*DUPLICATE	IDENT(ATR)
a. kómetel $\text{\textcircled{b}}$	*!		*
b. kómetel $\text{\textcircled{b}}$		*!	**
c. kómetel $\text{\textcircled{b}}$		*!	***
d. kómetel $\text{\textcircled{b}}$		*!	***
$\text{\textcircled{b}}$ e. kómetel $\text{\textcircled{b}}$			****

b.

/kometel-os/	LICENSE([-ATR], \acute{o})	IDENT(ATR)	*DUPLICATE
a. kómetel $\text{\textcircled{b}}$	*!	*	
$\text{\textcircled{b}}$ b. kómetel $\text{\textcircled{b}}$		**	*
c. kómetel $\text{\textcircled{b}}$		***!	*
d. kómetel $\text{\textcircled{b}}$		***!	*
e. kómetel $\text{\textcircled{b}}$		***!*	

- PO predicts all-or-nothing harmony of nonfinal post-tonic vowels.

3.2 Maximal Harmony

(10) LICENSE([-ATR], ∀V): In a form containing [-ATR], assign one violation mark for each vowel that is not associated with that feature. (= MAXLIC; Walker 2011)

- Add MAXLIC to the variable ranking:

(11) a.

/rekóhe lo-s/	LICENSE([-ATR], \acute{o})	IDENT(ATR)	MAXLIC	*DUPLICATE
a. rekóhelo	*!	*	***	
☞ b. rekóhelo		**	**	*
c. rekóhelo		***!	*	
d. rekóhelo		***!*		
e. rekóhelo		***!	*	*

b.

/rekóhe lo-s/	LICENSE([-ATR], \acute{o})	*DUPLICATE	IDENT(ATR)	MAXLIC
a. rekóhelo	*!		*	***
b. rekóhelo		*!	**	**
☞ c. rekóhelo			***	*
d. rekóhelo			****!	
e. rekóhelo		*!	***	*

c.

/rekóhe lo-s/	LICENSE([-ATR], \acute{o})	MAXLIC	*DUPLICATE	IDENT(ATR)
a. rekóhelo	*!	***		*
b. rekóhelo		*!*	*	**
c. rekóhelo		*!		***
☞ d. rekóhelo				****
e. rekóhelo		*!	*	***

- PO predicts that post-tonic harmony is a prerequisite for pretonic harmony.

(12)

/moneder-os/	LICENSE([-ATR], \acute{o})	MAXLIC	IDENT(ATR)
a. moneðérɔ	*!	***	*
b. moneðérɔ		*!*	**
c. moneðérɔ		*!	***
d. moneðérɔ		*!	***
☞ e. moneðérɔ			****

- PO predicts coordinated harmony in pretonic vowels.

3.3 Summary

- The PO analysis is simple and elegant.
- It uses only well-motivated constraints that are typical of the kinds of processes we're dealing with, and yields all and only the attested variation.

4 Serial Variation

- SV combines PO with Harmonic Serialism (HS):
 - Outputs are produced step by step.
 - Candidates may differ from the input by at most one change.
 - The winner on an evaluation becomes the input for the next evaluation.
 - The derivation converges when the output matches the input.
- Local optionality arises if the ranking can change from step to step.
- A variable ranking between *DUPLICATE and IDENT doesn't work.

▷ Step 1: aspiration, final laxing

▷ Step 2: metaphony:

(13)

/kómetelɔ/	LICENSE([-ATR], ó)	*DUPLICATE	IDENT(ATR)
a. kómetelɔ	*!		
☞ b. kómetelɔ		*	*
c. kómetelɔ	*!		*
d. kómetelɔ	*!	*	*

▷ Step 3:

- IDENT(ATR) ≫ *DUPLICATE: convergence on *kómetelɔ*
- *DUPLICATE ≫ IDENT(ATR) doesn't favor harmony of intervening vowels:

(14)

/kómetelɔ/	LICENSE([-ATR], ó)	*DUPLICATE	IDENT(ATR)
a. kómetelɔ	*!		*
☞ b. kómetelɔ		*	
c. kómetelɔ		*	*!
d. kómetelɔ		*	*!

- (15) PROXIMITY: Corresponding elements are located in adjacent syllables. Assign one violation for each syllable that intervenes between correspondents. (after Rose 2004, Rose & Walker 2004)

(16)

/kómetelɔ/	LICENSE([-ATR], \acute{o})	PROXIMITY	IDENT(ATR)
a. kómetelɔ	*!		*
b. kómetelɔ		**!	
☞ c. kómetelɔ		*	*
☞ d. kómetelɔ		*	*

- If this ranking holds on the next iteration, we get *kómetelɔ*.
- But the other ranking converges on **kómetelɔ* or **kómetelɔ*:

(17)

/kómetelɔ/	LICENSE([-ATR], \acute{o})	IDENT(ATR)	PROXIMITY
⊖ a. kómetelɔ			*
b. kómetelɔ		*!	
c. kómetelɔ		*!	**

- The problem: IDENT favors whatever the last iteration gave us.
- Instead of IDENT, we need a constraint that favors incremental retraction of harmony; e.g. $*[-ATR]$:

(18)

/kómetelɔ/	LICENSE([-ATR], \acute{o})	$*[-ATR]$	PROXIMITY
a. kómetelɔ		***!	*
b. kómetelɔ		***!*	
☞ c. kómetelɔ		**	**

- Adding MAXLIC produces maximal harmony incrementally, too.

4.1 Assessment

- SV works because neither $*[-ATR]$ nor PROXIMITY is (maximally) satisfied by incomplete harmony.
- The analysis virtually replicates the PO analysis.

- Problem: PROXIMITY is a gradient constraint.
 - Gradient constraints have been argued to be faulty on typological and computational grounds (Eisner 1997, McCarthy 2003, Potts & Pullum 2003).
- The analysis relies on a defective constraint type—PO is preferable.

5 Markedness Suppression

5.1 Metaphony

- MS: languages can tag any markedness constraint as *suppressible* (indicated by \odot): on any evaluation, any number of violation marks assigned by this constraint can be discarded.
- Obvious approach: \odot *DUPLICATE. But this overgenerates:

(19)

/kometel-os/	LICENSE([-ATR], \acute{o})	\odot *DUPLICATE	IDENT(ATR)
a. kómetelɔ	*!		*
(\blacksquare) b. kómetelɔ		*!	**
\odot c. kómetelɔ		o	***
\odot d. kómetelɔ		o	***
(\blacksquare) e. kómetelɔ			****!

- We need another non-suppressible constraint to rule out candidates (c) and (d):

(20) *DUPLICATE_{/extra-weak}: No element that stands in correspondence with another output element may appear in a nonfinal post-tonic syllable.

- In many Romance varieties, post-tonic syllables show signs of weakness, and nonfinal post-tonic syllables often display even greater weakness (Walker 2011).
- *DUPLICATE_{/extra-weak} bans corresponding output features in these “extra weak” syllables:

(21)

/kometel-os/	LICENSE([-ATR], \acute{o})	\odot *DUP	*DUP _{/xweak}	IDENT
a. kómetelɔ	*!			*
b. kómetelɔ		*!		**
c. kómetelɔ		o	*!	***
d. kómetelɔ		o	*!	***
(\blacksquare) e. kómetelɔ				****

5.2 Maximal Harmony

- \odot MAXLIC again overgenerates:

(22)

/rekóhe lo-s/	LICENSE([-ATR], \acute{o})	\odot *DUP	*DUP/ _{xweak}	\odot MAXLIC	IDENT
a. rekóhelə	*!			***	*
(☞) b. rekóhelə		*!		**	**
(☞) c. rekóhelə				*!	***
\odot d. rekóhelə		○		○	***
(☞) e. rekóhelə					****!

- Solution: a constraint preventing pretonic harmony in the absence of total harmony: the local conjunction of MAXLIC with either of the following constraints.

- (23)
- IDENT(ATR)-pretonic: assign one violation mark for each pretonic vowel that is unfaithful for [ATR].
 - CRISPEGE(ATR): don't spread beyond the left edge of the stressed syllable. (informal definition)

(24)

/rekóhe lo-s/	LICENSE	IF PRE HARM THEN MAX HARM	\odot *DUP	*DUP/ _{xweak}	\odot MAXLIC	IDENT
a. rekóhelə	*!				***	*
b. rekóhelə			*!		**	**
c. rekóhelə					*!	***
d. rekóhelə		*!	○		○	***
(☞) e. rekóhelə						****

5.3 Assessment

- The analysis is unattractive.
- The harmony-as-a-block restrictions must be stipulated with extra constraints.
- Why does the analysis require so much machinery?
 - The constraints that rule out the unattested forms—MAXLIC, *DUPLICATE, IDENT—are the same ones that distinguish the actual forms.
 - By making satisfaction of these constraints optional, we don't just reward the attested variants—we help the unattested ones, too.

6 Conclusion

- Of the three analyses, PO is best. Whether we prefer SV over MS or vice versa depends on how we weigh simplicity versus constraint well-formedness.
- SV and MS analyses are carefully engineered to produce the right results, but the PO analysis succeeds using constraints that are designed for these kinds of harmony independently.
- Eastern Andalusian has aspects of local optionality. Multiple rankings can't produce local optionality, but it works here. Why?
 - PO divides the variation into two “modules”—post-tonic harmony and maximal harmony—each of which shows all-or-nothing characteristics.
- Perhaps multiple-ranking theories aren't typologically deficient after all.
 - Claims for its deficiency haven't been investigated fully.
 - It would be surprising, given the size of the constraint set, if no constraint favors forms with intermediate levels of process application.

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